EPA Region 7 TMDL Review

TMDL ID:	IA 01-MAQ-0060_1	**Waterbody ID:**	IA 01-MAQ-0060-1
Waterbody Name:	MAQUOKETA RIVER		
Tributary:	MAQUOKETA RIVER		
Pollutant:	PATHOGENS		
State:	IA	**HUC:**	
BASIN:			
Submittal Date:	9/22/2006		
Approved:	No		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Letter, dated September 20, 2006, and received by EPA on September 22, 2006, formally submitted this TMDL for approval under section 303(d).

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

The waterbody loading capacity cannot be reasonably expressed as a mass per time. Because the risk and corresponding water quality criteria associated with bacteria are based on epidemiological studies relating illness rates to concentration, these TMDL are expressed as a relationship of concentration at a continuum of flow conditions, as shown on the duration curve in Figure 9. This concentration is 126 organisms / 100 ml for the geometric mean or 235 organisms / 100 ml for the single sample maximum. The targets given should result in attainment of water quality standards.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The Iowa E. coli Bacteria Criteria for primary contact recreation are a season geometric mean of 126 organisms/100 ml of water and a single sample maximum value of 235 organisms/100 ml of water. The applicable designated uses are primary contact recreation and aquatic life.

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

This TMDL is expressed as a percentage of reduction in loading to achieve a fecal coliform target that is set at the E. Coli standard. Reductions are required for non-point source loads such as runoff from feedlots and pasture lands, manure applied to cropland and pasture that are transported by precipitation events and those that are relatively constant such as cattle in streams and failed septic tanks. To achieve the standard, there must be 78% reduction in bacterial loads delivered by surface runoff and a 40% reduction in other bacterial load sources such as septics and cattle delivering directly to streams.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

Nonpoint sources of pathogen indicators have been identified as the main cause of the primary contact recreation use impairment for this segment of the Maquoketa River. Point sources, such as wastewater treatment plants, are also likely contributors to the total pathogen load but play a more minor role.

The Maquoketa River basin is located in east-central and northeast Iowa and runs northwest to southwest. The total area of the Maquoketa River basin above the impaired segment is 959 square miles, sixty-five percent of which lies in the landform region called the Iowan Surface. The rest is located in the Southern Iowa Drift Plain landform. The Iowa Surface is a geologically complex region located between the bedrock-dominated landforms of the Paleozoic Plateau region and the relatively recent glacial drift landforms of the Des Moines Lobe. In the northern portion of the region, the glacial deposits are thin, and shallow limestone bedrock creates karst features such as sinkholes and sags. The Southern Iowa Drift Plain region covers approximately 46 percent of Iowa and contains all or part of 66 counties. This landform region was created by a combination of several older glacial ice sheets, wind-deposited loess, and the erosive power of water. Many finely-etched rills give way to ravines, then to creeks that flow part of the year, and eventually to perennial streams and rivers in major valleys.

Agriculture is the primary land use and includes row crop farming, small grains, hay production and pasture land. Livestock feeding operations are found in the watershed with beef and hog operations the most common. These land uses are not spatially uniform across the entire watershed, however, as the upper portion tends to favor row cropping (corn and soybeans) and hog production while the lower portion of the watershed is more suitable for hay and pasture operations with beef and dairy livestock. Wildlife species present in the area include whitetail deer, red fox, beavers, raccoons, ring-necked pheasants, mourning doves, and numerous other species of songbirds, waterfowl, reptiles and amphibians.

There are four permitted facilites located in the watershed that have a fecal coliform discharge limit (Camp Courageous of Iowa NPDES IA071820, City of Manchester STP NPDES IA0021032, City of Maquoketa STP NPDES IA 0024481, and City of Monticello STP NPDES IA0026034). Other permitted facilities in the watershed have no specified limitation on effluent fecal coliform, but may be potential sources (Baldwin City of STP NPDES IA0063398, Delaware City of STP NPDES IA0062855, Delhi City of STP NPDES IA0047848, DNR Backbone State Park (Lower Area) NPDES IA0066044, DNR Backbone State Park (Cabins and Spillway) NPDES IA0075876, DNR Backbone State Park (Ranger's Residence) NPDES IA0076937, DNR Manchester Trout Hatchery NPDES IA00022275, DNR Maquoketa Caves State Park NPDES IA0076473, Dundee City of STP NPDES IA0062839, Earlville City of STP NPDES IA0042773, Edgewood City of STP NPDES IA0024490, Edinburgh Manor of Jones County NPDES IA0065960, Greeley City of STP NPDES IA0040291, Hopkinton City of STP NPDES IA0023469, Lamont City of STP NPDES IA0025348, Onslow City of STP NPDES IA0057134, Penn Center, Inc. NPDES IA0065854, Ryan City of STP NPDES IA0041785, Strawberry Point City of STP (North) NPDES IA0042765, Strawberry Point City of STP (South) NPDES IA0042757, and Wyoming City of STP NPDES IA0032646).

It appears all sources have been identified.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

Specific wasteload allocations have been set for each permitted treatment facility above the impaired segment, as displayed in table 10. Facilities that discharge directly to the receiving waterbody must not exceed the current water quality standards in terms of end-of-pipe fecal coliform concentrations. The four facilities which currently have effluent limits for fecal coliform written in their NPDES permit will require reductions in their permit limits based on the WLAs given in Table 10. For facilities which discharge indirectly to the Maquoketa Rivier (via tributaries upstream of the impaired segment), the wasteload allocations are set higher than 126 colony-forming units (CFU)/100 ml (geometric mean) and 235 CFU/100 ml (single sample maximum). To achieve the target indicator pathogen load, reductions in nonpoint sources will be necessary. Modeling suggests that to meet water quality standards, a 78% reduction in rain driven surface runoff loads and a 40% reduction in other NPS bacterial loads (e.g., septics and cattle in the stream) must be achieved.

WLA Comment

Currently, only four permitted facilities in the watershed have fecal coliform limits in their permit. Point sources do not appear to be contributing to the impairment in this segment of the Maquoketa River, as indicated by modeling results. Therefore, the total wasteload allocation for this TMDL is set to the existing target levels for E. coli water quality standards of 126 CFU/100 ml (geometric mean) or 235 CFU/100 ml (single sample maximum). Wasteload allocations are located in Table 10.

Table 10. Wasteload Allocations (WLA)

Treatment facility name	Receiving Stream	Miles to impaired reach,	Fraction after decay	Geometric mean	Daily max.
Camp Courageous of Iowa	Unnamed Trib. to Maquoketa River	7.6	0.62	203	379
City of Manchester STP	Maquoketa River	0	1	126	235
City of Maquoketa STP	Maquoketa River	0	1	126	235
City of Monticello STP	Maquoketa River	0	1	126	235
Delaware City of STP	Peen Creek	14.5	0.4	315	588
Baldwin City of STP	Bear Creek	7.2	0.64	197	367
Delhi City of STP	Unnamed creek to Maquoketa River	1.7	0.9	140	261
DNR Backbone State Park (Lower area)	Dry run to Maquoketa River	0	1	126	235
DNR Backbone State Park (Cabins and Spillway)	Maquoketa River	0	1	126	235
DNR Backbone State Park (Ranger's Residence	Maquoketa River	0	1	126	235
DNR Manchester Trout Hatchery	Spring Branch	1.9	0.89	142	264

Table 10. Wasteload Allocations (WLA) (cont.)

Treatment facility name	Receiving Stream	Miles to impaired reach,	Fraction after decay	Geometric mean	Daily max.
DNR Maquoketa Caves State Park	Drainage Ditch to Raccoon Creek to Maquoketa River	1.3	0.92	137	255
Dundee City of STP	Maquoketa River	0	1	126	235
Earlville City of STP	Plum Creek	14	0.42	300	560
Edgewood City of STP	Honey Creek	12.5	0.46	274	511
Edinburgh Manor of Jones County	Dry Creek Bed to Mineral Creek to Maquoketa River	4.5	0.75	168	313
Greeley City of STP	Plum Creek	27	0.18	700	1306
Hopkinton City of STP	Unnamed Trib. to Maquoketa River	0	1	126	235
Lamont City of STP	Lamont Creek to S. Fork of Maquoketa River	3.9	0.78	162	301
Onslow City of STP	Beers Creek	9.7	0.55	229	427
Penn Center, Inc.	Unnamed Trib. to Maquoketa River	1.2	0.93	135	253
Ryan City of STP	Buck Creek	15	0.39	323	603
Strawberry Point City of STP (North)	Kleinlein Creek	3.6	0.8	158	294
Strawberry Point City of STP (South)	Co. Drainage Ditch to Fenchel Creek	3.6	0.8	158	294
Wyoming City of STP	Big Bear Creek	23.5	0.23	548	1022

LA Comment

Runoff conditions are strongly tied to elevated bacteria levels, therefore, load allocations assigned to these TMDL will be based upon the geometric mean of 126 / 100 ml - applicable target water quality criteria for E. coli.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

These TMDLs are expressed as a percentage of reduction in loading to achieve a fecal coliform target that is set at the E. coli standard. The margin of safety is thereby explicit due to targeting fecal coliform reductions at the E. coli standard level.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

This TMDL was developed based on the Iowa water quality standards primary contact recreation season that runs from March 15 to November 15.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public meetings were held in July 2005 to seek comments and input from local stakeholders for the development of the TMDL. A second round of public meetings was held on August 2, 2006 in Maquoketa and at Backbone State Park to present the draft TMDL and allow for comments and suggestions on the final draft. Comments received were reviewed and given consideration and, where appropriate, incorporated into the TMDL.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Water quality monitoring is ongoing at the IDNR ambient station on the Maquoketa River near Maquoketa, IA. At the current time no additional monitoring is scheduled, although seventeen candidate sites which were targeted to TMDL monitoring in 2001 offer potential locations for additional data collection.

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

There was no allowance for future growth included in this TMDL because current watershed land uses are predominantly agricultural and the addition/deletion of animal feeding operations cannot be predicted or quantified at this time. Permitted sources are limited to the water quality criteria at the point they influence the primary contact recreation use segment. Reasonable assurances of nonpoint sources are not required.